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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/576,211	05/23/2000	Katsunori Yanagida	NOK-004	2885

20374 7590 05/01/2003  
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WASHINGTON, DC 20006

EXAMINER
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MERCADO, JULIAN A

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 05/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/576,211

Applicant(s)

YANAGIDA ET AL.

Examiner

Julian A. Mercado

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-80 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-80 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 November 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

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## DETAILED ACTION

### *Remarks*

This Office Action is responsive to applicant's paper filed November 25, 2002.

The rejection(s) based on Kawakami et al. under 35 U.S.C. 102(b) and 103(a) has been withdrawn in favor of the new ground of rejection set forth below. This Office Action is therefore made NON-FINAL.

The rejection based on Kawakami has been withdrawn in view of the examiner's new understanding (based on applicant's remarks and consultation with a Japanese translator on the related priority documents of the Kawakami patent) that the auxiliary conductive material disclosed in column 8 line 26-31 is added to the binder and forms part of the active material layer and not specifically within the hollow structure of the carbon particles which form an integral part of that layer. Although Figure 3 is still believed to show a hollow carbon structure [100] filled with a conductive material [104], the Kawakami reference does not specifically teach that this conductive material is a carbon or carbonaceous material.

Applicant's representative, Mr. Ron Kubovcik, brought to the examiner's attention that the February 6, 2003 Office Action did not clearly delineate the teachings of Takami et al. from Tamaki et al. (each as presently relied upon in a section 103(a) rejection) This Office Action is hoped to clear up any ambiguities. The period for reply is restarted.

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***Drawings***

The Figure 2 drawing was received with the November 25, 2002 paper. These drawings are approved by the examiner. Accordingly, the examiner's objection to the drawings as discussed in the previous Office Action has been withdrawn.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2, 6-13, 17-28, 32-39, 43-54, 58-66 and 70-80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mabuchi et al. (U.S. Pat. 6,156,432) in view of Hamada et al. (U.S. 6,194,067 B1)

At the outset, from a stand-alone reading of applicant's claim language and reading of applicant's claims in light of the specification, it appears to the examiner that the first and second carbon materials are two distinct carbon materials. The rejection of the claims in view of this interpretation here follows.

Regarding claims 1 and 12, Mabuchi teaches a first carbon material such as graphite serving as an inner core particle having an outer surface which is coated with a second carbon material such as pitch or tar. (col. 4 line 23-41) This first and second carbon material is employed in a battery negative electrode. (applies to claims 27, 38, 53, 65)

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Mabuchi does not explicitly teach the second carbon material to contain boron and nitrogen. However, Hamada teaches the outer layer of a carbon material to contain boron and nitrogen. (col. 2 line 59 et seq.) Thus, the skilled artisan would find obvious to modify Mabuchi's invention by employing boron and nitrogen, i.e. boron nitride in the carbon's outer surface. The motivation for such a modification would be to enhance charge/discharge characteristics and improve chemical stability. Additionally, it appears to the examiner that in Hamada, only the outer layer of the carbon material is treated, thus, the inner core is reasonably presumed to not contain boron and nitrogen. (applies to claim 2, 13, 28, 39, 54, 66)

As to the wt% of boron or nitrogen, it appears to the examiner that the amount of boron or nitrogen is from 5 to 30 wt% which meets the claimed range of at least 1 wt% or 5wt%. (col. 4 line 6-41) Notwithstanding, absent of unexpected results, it is asserted that the weight percentages of boron, nitrogen and carbon are optimizable parameters for result-effective variables. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) Hamada teaches optimization of the respective weights of boron, nitrogen and carbon based on the following inequalities:

$$0.05 < \frac{C(B)}{(C(B) + C(C) + C(N))} < 0.3$$

$$0.05 < \frac{C(N)}{(C(B) + C(C) + C(N))} < 0.3$$

The respective weights are result-effective as too low a wt% results in low chemical stability, while too high a wt% results in considerable fusion between particles.

While Mabuchi teaches that a lithium metal is employed for the positive electrode (col. 7 line 9 et seq. under Example 1), Mabuchi does not explicitly teach this metal to be a lithium metal oxide. (claim 64 and 80) However, Hamada teaches oxides of lithium metals for the positive electrode. (col. 7 line 58-67) Thus, the skilled artisan would find obvious to employ a

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lithium metal oxide in the positive electrode as such material has the desired high electrode potential to result in the battery having a long cycle life, high charge/discharge characteristics, high voltage and high energy density.

Claims 3, 4, 14, 15, 29, 30, 40, 41, 55, 56, 67 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mabuchi et al. and Hamada et al. applied to claims 1, 2, 6-13, 17-28, 32-39, 43-54, 58-66 and 70-80 above, and further in view of Takami et al. (U.S. Pat. 5,795,678)

The teachings of Mabuchi and Hamada are discussed above.

Mabuchi does not explicitly teach the first carbon material to have the instant 3.35 Å to 3.38 Å spacing  $d_{002}$  between (002) planes and at least 300 Å or 1000 Å in the size Lc of crystallites in the c-axis direction. However, Takami teaches that this spacing is desired as the theoretical capacity of graphite, i.e. carbon material, and that the size Lc is desired to be infinitely large. Thus, the skilled artisan would have found obvious to employ the instant spacings in Mabuchi's invention for reasons such as achieving optimal electrical capacity for the carbon material.

Claims 5, 16, 31, 42, 57 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mabuchi et al. and Hamada et al. applied to claims 1, 2, 6-13, 17-28, 32-39, 43-54, 58-66 and 70-80 above, and further in view of Tamaki et al. (U.S. Pat. 5,698,341).

Mabuchi does not explicitly teach the second carbon material to have the instant 3.37 Å to 3.90 Å spacing  $d_{002}$  between (002) planes. However, Tamaki teaches that for a carbon material containing boron it is desired to have the instant spacings. (Col. 4 line 18 et seq.) Thus, the skilled artisan would have found obvious to employ the instant spacings in Mabuchi's

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invention for reasons such as increasing the charge and discharge capacities of the electrode material.


***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian A. Mercado whose telephone number is (703) 305-0511.

The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



April 15, 2003



Patrick Ryan  
Supervisory Patent Examiner  
Technology Center 1700